What is claimed is:

1. A locomotive, comprising:

a plurality of direct current traction motors corresponding to a plurality of axles and a plurality of drive switches, each traction motor operating in a driven mode and a free-wheeling mode, wherein in the driven mode a power pulse passes through the traction motor and the corresponding drive switch and in the free-wheeling mode the power pulse passes through the traction motor and bypasses the corresponding drive switch;

a plurality of filters, each filter corresponding to one of the plurality of direct current traction motors, to absorb electrical voltage transients and smooth current ripples through the traction motors resulting from changes between the driven and free-wheeling modes.

2. The locomotive of Claim 1 further comprising:

a plurality of free-wheeling bypass circuits, each bypass circuit bypassing a corresponding one of the plurality of drive switches.

3. The locomotive of Claim 1, further comprising:

a plurality of chopper circuits corresponding to the plurality of direct current traction motors, each chopper circuit comprising the free-wheeling bypass circuit, the drive switch being in electrical communication with a respective direct current traction motor, and at least one of the filters.

4. The locomotive of Claim 3, wherein, during a selected time interval, a first chopper circuit corresponding to a first traction motor is in the first mode and a second chopper circuit corresponding to a second traction motor is in the second mode.

5. A locomotive, comprising:

a plurality of electrical storage subunits, wherein in a first mode the electrical storage subunits are connected electrically in series and in a second mode the electrical storage subunits are connected electrically in parallel.

6. The locomotive of Claim 5 further comprising:

at least one switch to switch the electrical storage subunits between the first and second modes.

7. The locomotive of Claim 5 wherein simultaneously some of the electrical storage subunits are electrically connected in series and others of the electrical storage subunits are electrically connected in parallel.

8. A locomotive, comprising:

a plurality of direct current traction motors in communication with a plurality of axles;

a prime energy source;

an energy conversion device, in communication with the prime energy source, to

convert the energy output by the prime energy source into direct current electricity ; and

an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity, wherein the energy storage device comprises a plurality of capacitors operable to store the stored energy.

9. The locomotive of Claim 8 wherein at least most of the stored electricity is stored in the plurality of capacitors.

10. The locomotive of claim 9 further comprising a pulse forming network to convert the output of the plurality of capacitors to a form acceptable to the traction motors.

11. A locomotive, comprising:

a plurality of traction motors in communication with a plurality of axles;

a prime energy source for providing power to the plurality of traction motors; and

a plurality of air brake systems operatively engaging a respective one of the plurality of axles, each air brake system comprising at least one movable braking surface element and corresponding air-brake cylinder and a fluid-activated brake release, wherein, when a moveable braking surface element is locked in position against a braking surface, fluid pressure is applied by the fluid-activated brake release to disengage the locked moveable braking surface from the braking surface.

12. The locomotive of Claim 11, further comprising:

an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity; and

an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity.

13. The locomotive of Claim 11 wherein each moveable braking surface element comprises a plurality of holes passing therethrough and the fluid-activated brake release forces fluid through the holes in the moveable braking surface element and against the braking surface to form a brake release force.

14. The locomotive of Claim 13 wherein the force required to unlock a locked braking surface element is the braking force and the release force is at least about 10% greater than the braking force.

15. A locomotive, comprising:

a plurality of direct current traction motors in communication with a plurality of axles;

a prime energy source;

an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity;

an energy storage device, in communication with the energy conversion device and

the plurality of traction motors, to receive and store the direct current electricity;

a controller operable to control an excitation current to the energy conversion device, wherein at least one of the following statements is true:

(i) when a first predetermined set point is exceeded by a first monitored parameter, the excitation current is increased and, when a second predetermined set point exceeds the first monitored parameter, the excitation current is decreased and wherein the first monitored parameter is revolutions per minute of a mechanical component of the prime energy source and

(ii) when the first predetermined set point is exceeded by a second monitored parameter, the excitation current is decreased and, when the second predetermined set point exceeds the second monitored parameter, the excitation current is increased and wherein the second monitored parameter is the output power of the energy conversion device.

16. The locomotive of Claim 15 wherein the first and second predetermined set points are selected to produce at least a desired degree of fuel efficiency for the prime energy source.

17. The locomotive of Claim 15 wherein (i) is true.

18. The locomotive of Claim 15 wherein (ii) is true.

19. A method for providing electrical energy to an energy storage device in a locomotive, comprising:

(a) providing a locomotive comprising:

(i) a plurality of direct current traction motors in communication with a plurality of axles;

(ii) a prime energy source;

(iii) an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity; and

(iv) an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity; and

(b) controlling an excitation current to the energy conversion device by performing at least one of the following steps:

(i) when a first predetermined set point is exceeded by a first monitored parameter, the excitation current is increased and, when a second predetermined set point exceeds the first monitored parameter, the excitation current is decreased and wherein the first monitored parameter is revolutions per minute of a mechanical component of the prime energy source and

(ii) when the first predetermined set point is exceeded by a second monitored parameter, the excitation current is decreased and, when the second predetermined set point exceeds the second monitored parameter, the excitation current is increased and wherein the

second monitored parameter is the output power of the energy conversion device.

20. The method of Claim 19 wherein the first and second predetermined set points are selected to produce at least a desired degree of fuel efficiency for the prime energy source.

21. The locomotive of Claim 19 wherein step (i) is performed.

22. The locomotive of Claim 19 wherein step (ii) is performed.

23. A locomotive, comprising:

a plurality of direct current traction motors in communication with a plurality of axles;

a prime energy source;

an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity;

an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity;

a controller operable to monitor an operational parameter of each of the plurality of axles and/or traction motors, wherein the monitored operational parameter is at least one of revolutions per minute of an axle, an electrical current provided to a traction motor, and a voltage applied to a component of a traction motor.

24. The locomotive of Claim 23 wherein the controller is operable to control each of the plurality of traction motors independently of the other traction motors.

25. The locomotive of Claim 23 wherein the controller is operable to decrease power supplied to a first traction motor engaging a first axle without decreasing the power supplied to other traction motors when the revolutions per minute exceed a selected threshold.

26. The locomotive of Claim 23 further comprising:

an air brake assembly located on each of the plurality of axles, the air brake assembly comprising one or more brake shoes, an air cylinder, and an fluid-activated brake release.

27. The locomotive of Claim 25 wherein, when a first air brake assembly is locked in engagement with a first braking surface on a first axle but a second air brake assembly is not locked into engagement with a second braking surface on a second axle, the controller is operable to activate a first fluid-activated brake release on the first axle without activating a second fluid-activated brake release on the second axle.

28. The locomotive of Claim 26 wherein a brake assembly is deemed to be locked when the locomotive is in motion, the air brake assembly is deactivated, and the revolutions per minute on the axle engaging the air brake assembly are at least substantially zero.

29. A method for controlling the operation of a locomotive, comprising:

(a) providing a locomotive, the locomotive comprising:

(i) a plurality of direct current traction motors in communication with a plurality of axles;

(ii) a prime energy source;

(iii) an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity; and

(iv) an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity; and

(b) monitoring an operational parameter of each of the plurality of axles and/or traction motors, wherein the monitored operational parameter is at least one of revolutions per minute of an axle, an electrical current provided to a traction motor, and a voltage applied to a component of a traction motor.

30. The method of Claim 29 further comprising:

controlling each of the plurality of traction motors independently of the other traction motors.

31. The method of Claim 29 further comprising:

decreasing power supplied to a first traction motor engaging a first axle without

decreasing the power supplied to other traction motors when the revolutions per minute of the first axle exceed a selected threshold.

32. The method of Claim 29 wherein the locomotive comprises an air brake assembly located on each of the plurality of axles, the air brake assembly comprising one or more brake pads, an air cylinder, and an air-activated brake release.

33. The method of Claim 29 further comprising:

when a first air brake assembly is locked in engagement with a first braking surface on a first axle but a second air brake assembly is not locked into engagement with a second braking surface on a second axle, activating a first fluid-activated brake release on the first axle without activating a second fluid-activated brake release on the second axle.

34. The locomotive of Claim 33 wherein a brake assembly is deemed to be locked when the locomotive is in motion, the air brake assembly is deactivated, and the revolutions per minute on the axle engaging the air brake assembly are at least substantially zero.

35. A locomotive, comprising:

a plurality of direct current traction motors in communication with a plurality of axles;

a prime energy source;

an energy conversion device, in communication with the prime energy source, to

convert the energy output by the prime energy source into direct current electricity;

an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity;

a user interface operable to receive a command from an operator to control a locomotive speed at a specified velocity; and

a controller operable to control the velocity of the locomotive at or near the specified velocity by performing at least one of the following steps:

(i) maintaining a substantially constant power across each of the plurality of traction motors, the power being related to the specified velocity; and

(ii) maintaining the revolutions per minute of each of the plurality of axles at a rate related to the specified velocity.

36. The locomotive of Claim 35 wherein step (i) is performed.

37. The locomotive of Claim 35 wherein step (ii) is performed.

38. The locomotive of Claim 35 wherein corresponding power applied across at least two of the traction motors are different.

39. The locomotive of Claim 35 wherein corresponding revolutions per minute of at least two of the axles are different.

40. A method for operating a locomotive, comprising:

(a) providing a locomotive, the locomotive comprising:

(i) a plurality of direct current traction motors in communication with a plurality of axles;

(ii) a prime energy source;

(iii) an energy conversion device, in communication with the prime energy source, to convert the energy output by the prime energy source into direct current electricity;

(iv) an energy storage device, in communication with the energy conversion device and the plurality of traction motors, to receive and store the direct current electricity; and

(v) a user interface operable to receive a command from an operator to control a locomotive speed at a specified velocity; and

(b) controlling the velocity of the locomotive at or near the specified velocity by performing at least one of the following steps:

(i) maintaining a substantially constant power across each of the plurality of traction motors, the power being related to the specified velocity; and

(ii) maintaining the revolutions per minute of each of the plurality of axles at a rate related to the specified velocity.

41. The method of Claim 40 wherein step (i) is performed.

42. The method of Claim 40 wherein step (ii) is performed.

43. The method of claim 40 wherein corresponding power applied across at least two of the traction motors are different.

44. The method of Claim 40 wherein corresponding revolutions per minute of at least two of the axles are different.

45. A power control system for a locomotive, comprising:

a controller operable to determine an electrical current passing through each of a plurality of direct current traction motors; and

a graphical user interface operable to provide the electrical current passing through each of the plurality of direct current traction motors to an operator.

46. The power control system of claim 45, wherein the controller is operable to activate an alarm when the electrical current passing through one or more of the direct current traction motors exceeds a predetermined threshold.

47. A power control method for a locomotive, comprising:

determining an electrical current passing through each of a plurality of direct current traction motors; and

providing the information of the electrical current passing through each of the plurality of direct current traction motors to an operator.

48. The power control method of claim 47, further comprising:

activating an alarm when the electrical current passing through one or more of the direct current traction motors exceeds a predetermined threshold.